REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-7 are presently active in this case, the specification and Claims 1-7 are amended by way of the present amendment.

In the outstanding Office Action, the specification was object to, and Claims 1-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,914,187 to Naruse et al. in view of JP 09299731 to Wada et al.

With regard to the objection to the specification, Applicants have amended the specification to separate "PeriodicTable" into "Periodic Table," as pointed out by the Office Action. Therefore, the objection to the specification is believed to be overcome.

Applicants have also amended the claims to correct discovered informalities. The amendments do not raise an issue of new matter.

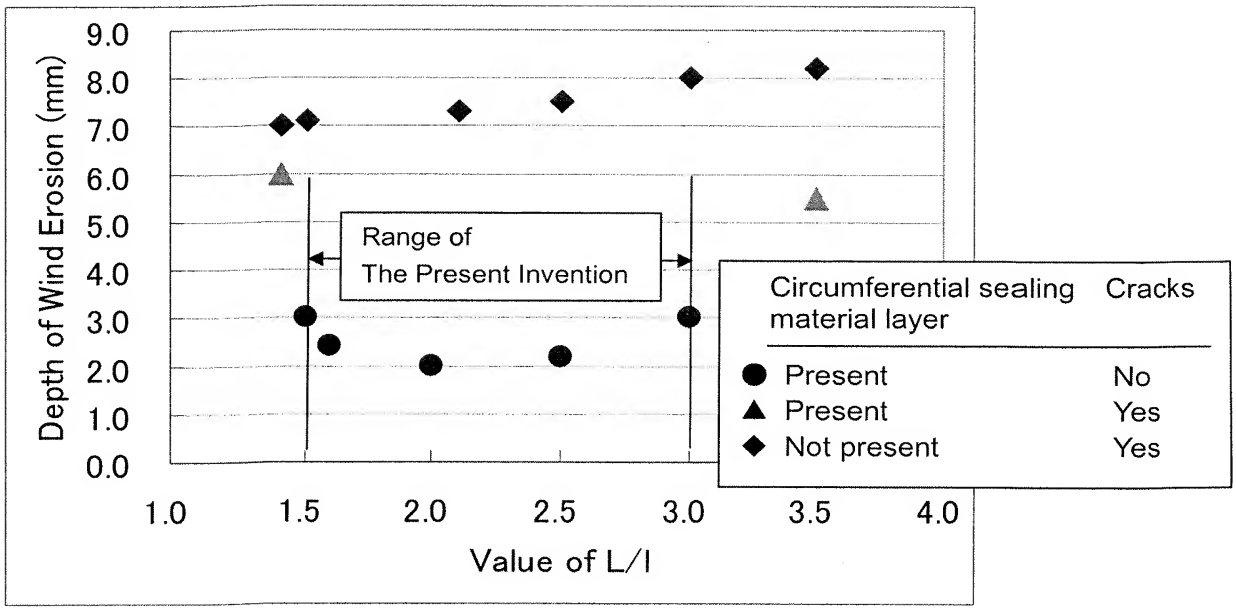
Turning now to the merits, Applicants' invention is directed to a honeycomb filter for purifying exhaust gas in an automobile exhaust system. Such a filter generally includes porous ceramic members that are bound together with a sealing material layer interposed therebetween. As discussed in the Background section of Applicants specification, conventional filters of this type are problematic in that an intersection portion of the sealing material layer referred to as a "crisscross section" is likely to suffer from wind erosion that forms large depressions in the crisscross section.[1] As particles accumulate in the depressions, thermal stress results from the purification process, which can damage the filter.[2] Applicants' invention is directed to addressing this problem.

[1] Applicants' specification at paragraph 8.
[2] Applicants' specification at paragraphs 9-10.

Specifically, Applicants' independent claim 1 recites a honeycomb filter for purifying exhaust gases. The honeycomb filter includes a plurality of rectangular columnar porous ceramic members combined with one another by a sealing material layer to constitute a ceramic block, each rectangular columnar porous ceramic member including a plurality of through holes that are placed in parallel with one another in a length direction with a partition wall interposed therebetween. A circumferential sealing material layer is formed on a circumference portion of the ceramic block. Also recited is that the partition wall which separates the through holes functions as a filter for collecting particulates. Finally, claim 1 recites that on a cross section perpendicular to the length direction of the porous ceramic member of the ceramic block, a maximum width L (mm) of the crisscross portion of the sealing material layer is 1.5 to 3 times greater than a minimum width l (mm) of the sealing material layer.

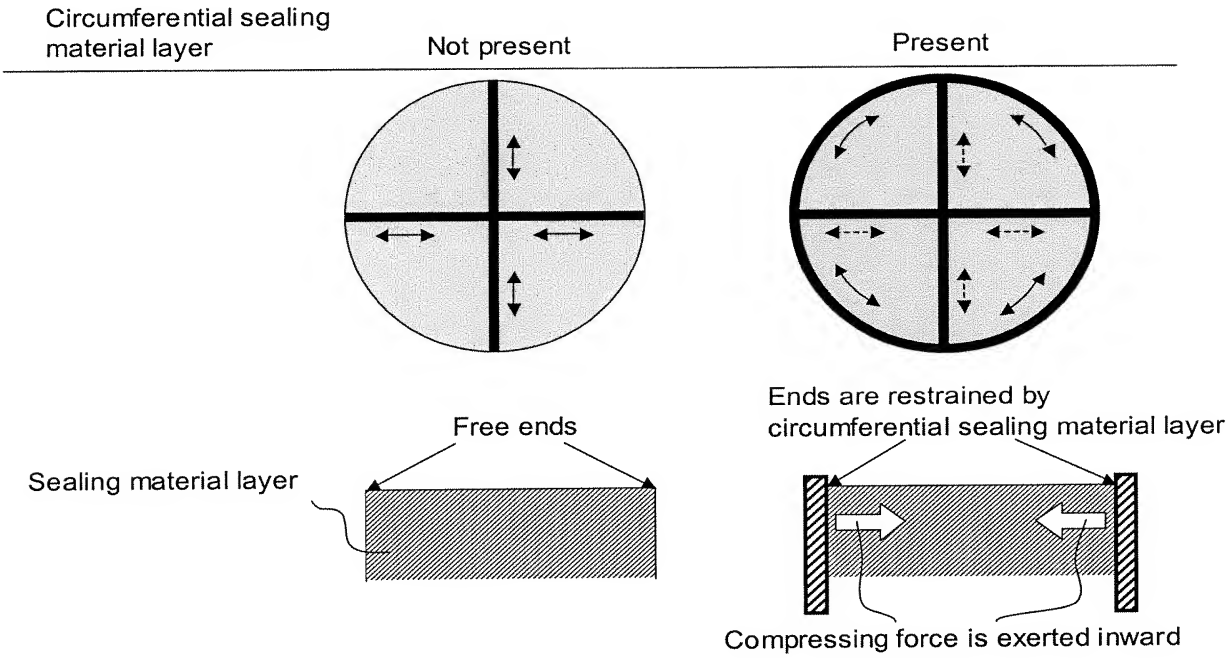
Thus, claim 1 recites the combined features of "a circumferential sealing material layer on a circumference portion of a ceramic block" and "a specific numerical range of L/l (a ratio of the maximum width L (mm) of a crisscross portion of the sealing material layer to the minimum width l (mm) of the sealing material layer)." As discussed throughout Applicants' specification, Applicants have discovered through extensive experiments that this claimed combination of features generates a synergistic, unexpected and advantageous effect for the honeycomb filter. Specifically, the following figure has been created from data in Tables 1 and 3 of Applicants' specification.[3] The figures shows the depth of wind erosion depressions in relation to the L/l parameter, for different configurations of the honeycomb filter.

[3] Applicants' specification at Examples 6 to 10, Comparative Examples 3 and 4, and Comparative Examples 13 to 19.



As seen in the above figure, when no circumferential sealing material layer is provided in the honeycomb filter, the depth of wind erosion is quite deep and becomes deeper irrespective of L/l. On the other hand, when a circumferential sealing material layer is provided, the wind erosion depth is relatively small, and the depth of wind erosion is dependant on the value L/l. In particular, when the value of L/l is 1.5 to 3.0, the depth (a depression of the crisscross portion) of wind erosion is significantly more shallow. As the depth of wind erosion becomes more shallow, particulates are less likely to accumulate on a wind eroded portion (within depressions). Therefore, heat generation upon the regenerating process in which the particulates are burnt can be reduced, thereby making it possible to prevent cracks of the sealing material layer.

The following figure demonstrates a possible reason why the depth of wind erosion shallows in the case where the circumferential sealing material layer is present.



As seen in the figures to the left, in the case where the circumferential sealing material layer is not present, a sealing material layer that has been heated radially lengthens relatively freely. In contrast, as seen in the figured to the right, when the sealing material layer is formed on the circumferential portion of the ceramic block, a compressing force is exerted inward over the entire honeycomb filter so that the crisscross portion between the sealing material layer can be compressed harder and substantially solidified. As discussed in Applicants' specification, it therefore becomes possible to improve durability of the filter against wind erosion and cracks, and also to strengthen the durability of the filter against vibration.[4] In this way, the features of "a circumferential sealing material layer" and "a specific numerical range of L/l" synergistically exert the advantageous effect of shallowing the depth of wind erosion.

[4] Applicants' specification at paragraph [0042].

In contrast, neither Naruse et al. nor Wada et al. discloses a circumferential sealing material layer as recited in claim 1. In this regard, the outstanding Office Action cites the Abstract of Naruse et al. as teaching the circumferential sealing material layer. However, the sealing material layer of Naruse et al. is only provided between ceramic members for adhering ceramic members with one another, but not provided as a circumferential sealing material layer formed on the ceramic block. In fact, Naruse et al. nor Wada et al. do not disclose any component corresponding to the circumferential sealing material layer of the claimed invention.

Further, Wada et al. defines a ratio of a length of part of a ceramic wall having a constant thickness to a distance between opposing ceramic walls, but does not disclose a ratio of the maximum width L of the crisscross portion of the sealing material layer to the minimum width l of the sealing material layer. This provides an additional basis for patentability of claim 1 over the cited references. That is, even if Naruse et al. and Wada et al. are combined, the combined configuration does not disclose the combined features of "a circumferential sealing material layer on a circumference portion of a ceramic block" and "a specific numerical range of L/l (a ratio of the maximum width L (mm) of a crisscross portion of the sealing material layer to the minimum width l (mm) of the sealing material layer)."

For the reasons discussed above, claim 1 patentably defines over the cited references. As Claims 2-6 depend from Claim 1, these claims also patentably define over the cited references. Nevertheless, Applicants submit that claim 2 provides an additional basis for patentability over the cited references. Specifically, claim 2 recites that "the outer circumferential face ***in the length direction*** has a curved face." The Office Action cites Figure 1 of Wada et al. as disclosing this feature; however this figure merely discloses a cylindrical shaped filter having no curve in a length direction. As discussed in Applicants' specification, when the shape of the honeycomb filter is a shape in which the circumferential

face in the length direction has a curved face, the flows of exhaust gases are allowed to easily form vortexes in the direction of the cross section of the filter so that the exhaust gases are easily made to flow into the filter in a spiral state. Therefore, it becomes possible to easily collect particulates evenly, and to evenly distribute wind erosion as a whole so as to be reduced, without being concentrated on the crisscross portion.[5] The cited references simply do not disclose the curved feature of claim 2, an cannot provide advantages thereof.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application and the present application is believed to be in condition for formal allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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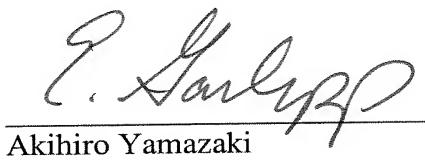
MAIER & NEUSTADT, P.C.



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[5] Applicants' specification at paragraph 49.